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Non-minimal coupling for the gravitational and electromagnetic fields: A general system of equations

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Abstract

We establish a new self-consistent system of equations for the gravitational and electromagnetic fields. The procedure is based on a non-minimal nonlinear extension of the standard Einstein-Hilbert-Maxwell action. General properties of a three-parameter family of non-minimal linear models are discussed. In addition, we show explicitly that a static spherically symmetric charged object can be described by a non-minimal model, second order in the derivatives of the metric, when the susceptibility tensor is proportional to the double-dual Riemann tensor. © 2005 IOP Publishing Ltd.

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